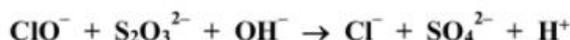


(d) Write the oxidation number for

(i) oxygen in  $\text{OF}_2$ ,

(ii) xenon in  $\text{XeF}_4$ .

(b) Define reduction in terms of (i) electron transfer, (ii) change in oxidation number. (6)



Assign oxidation numbers in the first equation above to identify (iii) the reducing reagent, (iv) the oxidising reagent. (9)

Using oxidation numbers, or otherwise, balance *either* equation. (10)

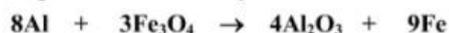
(c) Define oxidation in terms of (i) electron transfer, (ii) change in oxidation number. (6)

Use oxidation numbers to identify (iii) the oxidising agent, (iv) the reducing agent, in the following reaction.



Hence, or otherwise, balance the equation. (7)

(b) The following redox reaction is highly exothermic and is used to produce molten iron for welding pieces of steel together, e.g. sections of railway track:



(i) Define *oxidation* in terms of change in oxidation number.

Show using oxidation numbers that this is a redox reaction.

Identify the reducing agent. (12)

(ii) What mass of aluminium powder is required to produce 1008 g of molten iron for a single railway track weld?

What mass of aluminium oxide is produced as waste in the process? (13)

(e) Using oxidation numbers, or otherwise, balance the following equation.



(b) Define oxidation in terms of (i) electron transfer, (ii) change in oxidation number. (7)

(iii) For the redox reactions shown below, use oxidation numbers to identify the species oxidised in the first reaction and the oxidising reagent in the second reaction. (6)



(iv) Using oxidation numbers or otherwise balance both equations. (12)

(c) The halogens are good oxidising agents.

(i) How does the oxidation number of the oxidising agent change during a redox reaction? (4)

(ii) Assign oxidation numbers in each of the following equations to show clearly that the halogen is the oxidising agent in each case. (12)



Hence or otherwise balance the second equation. (6)

(iii) Why does the oxidising ability of the halogens decrease down the group? (3)